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TITLE: FOLDABLE AND REPARABLE DOUBLE-DECK AIR CUSHION FOR  
AIR CUSHIONED SHOES

ABSTRACT

The invention is related to a foldable and reparable double-deck air cushion for air cushioned shoes.

The air cushion of the present invention is injection molded into an air cushion of solid, hollow framework. By having the air cushion body provided with a given number of mutually communicating air chambers and configured into two decks which are foldable relative to each other, a foldable and reparable air cushion for air cushioned shoes is created. In addition, the air cushion is provided with one-way valves and relief valves so that the air cushion can be self-inflated and maintain its cushioning elasticity at a predetermined pressure.

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FOLDABLE AND REPARABLE DOUBLE-DECK  
AIR CUSHION FOR AIR CUSHIONED SHOES

The principal objects of the foldable and reparable double-deck air cushion for air cushioned shoes of the present invention consist in:

(1) providing a reparable air cushion for air cushioned shoes;

(2) providing a foldable double-deck air cushion which, by means of its double-deck foldable design and double air chamber groups design capable of being independently inflated, has the advantage that, when one of the air chamber groups is pierced, another supporting and inflatable air chamber group will always remain;

(3) providing a folded double-deck air cushion for enhancing optional flatness of the air cushion and, when one of the air cushions being pierced, causing another air cushion to retain the supportive cushioning elasticity and functions;

(4) providing an air cushion which can be inflated by automatic compression so that the air cushion can be inflated automatically and maintained at a preset safety pressure value (or preset value); and

-(5) providing a design enabling easy perforation repairs for the above-mentioned foldable, double-deck and inflatable air cushions such that a probability of higher than 90% that the pierced air cushion can be restored to its normal condition may be expected.

In contrast, conventional air cushions currently produced for air cushioned shoes are made with sheet material by heat sealing process and air is filled into the air cushion in various ways, for example:

(1) a liquid is directly injected into the sealed air chamber, which liquid volatilizes at normal temperature and makes the air chamber filled with gas after the liquid

becoming volatilized; (2) the air chamber is inflated by means of specified air inflating apparatus through a regular inner tube valve provided thereon, however, the air cushion will be deflated once having been pierced, becoming irreparable, completely losing its supportive function, and unable to be restored, hence making the air chamber invalidated once having been pierced; and (3) In another patented solid air cushion also owned by the applicant, said air cushion can be filled with gas or liquid, and, when being pierced and deflated, retains the ever existing solid supportive framework and elasticity, therefore it does not become flattened and keeps usable; however, it can not be repaired to restore the function of being able to prevent the filled gas or liquid from leaking. Therefore, no matter how good the air cushion is, once being pierced, there is no chance for the air cushion to be restored and this is one of the greatest threats to the life of conventional air cushioned shoes.

In the above-mentioned air cushions, except the patented air cushion of the applicant which retains the ever existing supporting force after being pierced, all other conventional products (including those produced in the Republic of China and other countries) have the significant disadvantage of becoming deflated and flattened. The reason is that conventional air cushions are compared to air bubble cloths generally used for packing which does not provide the ever existing supportive function and the cushioning elastic effect, thus just like the air bubble cloths, conventional air cushions will become flattened and can not be repaired and inflated again once being pierced, having no chance of being restored, and, at the same time, they completely lose the cushioning effect of an air cushion when being pierced.

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Accordingly, the applicant has devoted himself in deliberate researches and devised the "foldable and reparable double-deck air cushion for air cushioned shoes" of the present invention. By having two decks of air cushions and two groups of air chambers, the applicant is able to obtain an air cushion for air cushioned shoes which is tolerant toward being pierced, non-flattening, reparable, restorable, and can be automatically inflated, thereby the life span of the air cushion is extended and the value thereof increased. The present invention will now be described in greater detail with reference to the following drawings, in which:

Fig. 1 shows one of the air cushions of the present invention;

Fig. 2 shows another air cushion of the present invention;

Fig. 3 shows a further air cushion of the present invention;

Fig. 4 shows a further air cushion of the present invention;

Fig. 5 shows a further air cushion of the present invention;

Fig. 6 shows still another air cushion of the present invention;

Fig. 7 shows yet another air cushion of the present invention;

Fig. 8 is a schematic view, in cross section, showing the surface deck of the air cushion of the present invention;

Fig. 9 is another schematic view, in cross section, showing the surface deck of the air cushion of the present invention; and

Fig. 10 is a schematic view showing the repairing and leak-protection of the present invention.

Referring to Fig. 1, in which the reparable, foldable double-deck air cushion is shown as configured by connecting a fully-inserted air cushion (1) to another integrally formed half-inserted air cushion (2) by means of bellows-type bent tube provided on the rear end of the fully-inserted air cushion (1); the body of the fully-inserted air cushion (1) being provided with double rows of given number of mutually communicating solid air chamber groups (10) (may be configured in any geometrical shape, such as a square, a rectangle, a circle, or a triangle) disposed around the periphery thereof; the double rows of mutually communicating air chamber groups (10) being provided with transversal air chamber groups (11) in the inner space thereof; and the heel portion being a round air chamber (11A); the transversal air chambers (11) being communicating with the round air chamber (11) in the heel portion but separated from the air chambers (10) disposed around the periphery thereof, thereby to form into an air cushion having two separate air cushion faces; the double-rows of peripheral air chambers (10) being inflated through a nozzle provided on the air cushion (1), said nozzle being provided on a hollow round tubular passage (13) of the air cushion (1). In addition, the transversal air chamber groups (11) on the inner side of the air cushion (1) is inflated through a nozzle provided on another communicating half-inserted air cushion (2). Any two air chambers of the peripheral air chamber group (10) on the rear end of air cushion (1) are communicatingly connected to the peripheral air chamber group (20) of another integrally formed half-inserted air cushion (2), such that the peripheral air chamber group (10) of air cushion (1) is in communicating relation with the peripheral air chamber group (20) of air cushion (2). Inside the half-inserted air cushion (2) provided with communicating longitudinal air chambers (21) which are separated from

and not communicating with the peripheral air chamber group (20), the longitudinal air chamber (21) of air cushion (2) being communicating with the transversal air chamber group (11) of air cushion (1) through a bellows-type hallow bent tube (15) formed on the rear end of the longitudinal air chamber (21), and respective central air chambers (11) and (21) of air cushions (1) and (2) are inflated through a nozzle provided on the hollow round tubular passage (22) of the half-inserted air cushion (2).

The upper end lower surfaces of the fully-inserted air cushion (1) are flat-shaped. The lower surface of the half-inserted air cushion (2) is also flat, but the upper surface thereof is inwardly arcuated so as to conform with the arc of our feet. The half-inserted air cushion (2) is folded up back on the fully-inserted air cushion (1) with a sheet of light metal lined there between such that the air cushions (1) and (2) are prevented from being pierced at the same time by a pointed object and only the fully-inserted air cushion below will be pierced; furthermore, the peripheral air chamber group (10) of the fully-inserted air cushion (1) does not communicate with the inside transversal air chamber group (11), thus, when being pierced, only one of the air groups (10) or (11) will leak, the other air chamber group (11) or (10) remains intact, thereby maintains the ideal cushioning effect of the air cushion; when not having been pierced, the non-communicating air chamber groups (10) and (11) may be filled with ideal pressure such that the pressure in the inner and outer air cushions of the air cushions provides an ideal, adequate elasticity and supporting effect.

The passages (101) communicating between peripheral air chamber groups (10) of said air cushion (1) air situated at half the height of the air chambers, and the passages (101) are thus provided with a height difference from the

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bottom of the air chambers of air chambers groups (10). This design of height difference enables any air chamber of the air chamber groups (10) to be filled with a given volume of liquid without the liquid dissipating through the passages (101). The passages (111) between the mutually communicating inner transversal air chamber groups (11) and also positioned at a height from the bottom, such that the given volume of liquid filled into any transversal air chamber will not dissipate into adjacent air chambers through the passages (111). The passages which are mutually communicating and provided with height differences and the air chambers respectively provided in air chamber groups (10) and (11) may all be called as independent spaces, thus, when any air chamber of either air chamber group (10) or (11) being pierced, it can be repaired by injecting a strong bond into the air chamber through the pierced hole using an injector (the front end thereof is needle shaped such as a syringe).

To repair a pierced hole, the injector is inserted into the hole, first having the side to be repaired faced up, then injecting the strong bond; after a period of time (measured by usual drying time), then having the other side to be repaired of the same pierced hole face up, and again injecting a given quantity of strong bond to seal the hole. During the repairing process, the air cushion layer facing upward has to be repaired before the bottom layer of the air cushion contacting the ground, the portion that communicates between the pierced hole and the exterior in the last to be sealed. An adhesive cloth is stuck over the pierced hole on the sole of the shoe to prevent the back flow of the bond. Thus, after a given period of time, the filled bond will flatly cover the upper and lower layers of the pierced air chamber which serves as a leak-proof gasket, restoring the function of being able to be filled with gas again which never leaks. (This has been actually confirmed.)

Referring now to Fig. 2, there is shown another automatic inflatable and reparable folded double-deck air cushion of the present invention, in which, the fully-inserted air cushion (1) and the half-inserted air cushion (2) are similar to those described in Fig. 1; the differences consist in: a round air chamber (23) is provided on the heel portion of the half-inserted air cushion (2) at the heel stepping position where the central longitudinal air chambers (21) are located, and other longitudinal air chambers (21) are independently inflated through the original nozzle of the hollow round tubular passage (22); in addition, the peripheral air chamber group (20) of the outer air cushion (2) communicates with the peripheral air chamber group (10) of the fully-inserted air cushion (1) through double bellows-type bent tubes (14). The peripheral air chamber group (10) of the air cushion (1), however, communicates with the inner transversal air chamber group (11) and the round air chamber (11A) of the air cushion (1), and the round air chamber (11A) is, in turn, communicatingly connected to the round air chamber (23) of the air cushion (2), thereby to form into a communicating path; a tubular passage (231) being extended forwardly of the round air chamber (23) of the air cushion (20), a one-way intake valve (232) being provided on the end port of the tubular passage (231), a one-way valve (234) being also provided on the tubular passage (233) in the rear of the round air chamber (23) which communicates with the round air chamber (11A) of the air cushion (1) through said tubular passage (233), and a one-way valve (236) being also provided on the tubular passage (235) in the rear of the round air chamber (11A), which tubular passage communicates with both air chamber groups (10) and (11), and a relief tubular passage (237) branching from the first air chamber which is communicatingly connected at the end of said tubular passage (235); by means of a safety preset

adjustment valve (238) at the end port of said tubular passage (235), an automatic inflatable, reparable folded double-deck air cushion body being constructed.

The automatic inflation is effected by the compression and automatic elastic expansion of the round air chamber (23) of the air cushion (2), causing gas being sucked in through the intake valve (232), and constant compression and expansion causing gas being constantly sucked in and passing through one-way valves (234) and (236) respectively to fill into all the air chambers. When a preset pressure valve is reached, the excess of the constantly drawn in gas beyond the preset valve will be automatically discharged through the safety preset adjustment valve (238) such that the double-deck air cushion is inflated automatically and always maintained at a preset pressure valve, thereby to effect the function of automatic inflation. (Similar to that shown in Fig. 1, the air chambers and their communicating passages are designed with height differences, and therefore, the air chambers may also be repaired.)

Now referring to Figs. 3, 4 and 5, there are shown further embodiments of double-deck air cushions of the present invention. It can be seen from the drawings, in the embodiments, two air cushions (3) and (4) are superimposed to form into a single air cushion, the upper and lower superimposed air cushions (3) and (4) being both provided with given number of solid air chambers, thereby forming into communicating air chamber groups (31) and (41). Passages (32) communicate diagonally between individual air chambers in air chamber group (31) of the air cushion (3). Similarly, passages (42) communicate diagonally between individual air chambers in the air chamber group (41) of air cushion (4). Therefore, when oppositely superimposed, the two air cushions (3) and (4) do not interfere with each other. By applying adhesive

on the top of individual air chambers in respective air chamber groups (31) and (41) of the air cushions (3) and (4), the air cushions (3) and (4) can be recured together to form into a double-deck air cushion with the height of a single deck when they are superimposed (the air chambers in all the air chamber groups of the air cushion being interposed alternatatingly one to another). The air cushions (3) and (4) are provided with an independent inflating nozzle respectively; therefore, when air cushion (3) or (4) is pierced, another air cushion (4) or (3) still exists; certainly, communicating passages (32) and (42) between individual air chambers in respective air chamber groups (31) and (41) of the air cushions (3) and (4) are designed with height differences from the bottom of their own air cushions; thus any pierced air chambers of either air cushion can be repaired in the above mentioned manner, thereby to renew the function of being re-inflatable and leakproof, and create an excellent surface flatness for the air cushion.

Now referring to Fig. 6, there is shown still another embodiment of the present invention, in which, an air cushion (3A) is provided with a hollow round tubular passage (30) thereon for mounting the nozzle; a cover (4A) overlies on the air cushion (3A), which cover being also provided with a hollow round tubular passage (40) for mounting the nozzle so as to form into a single body structure composed of a pair of air cushion with a pair of air chamber groups which are complementary and provide excellent surface flatness for the air cushion.

Now referring to Fig. 7, which is an illutration of the double-deck air cushion of the present invention, in which, two air cushions (5) and (6) are integrally formed which can be folded into a single air cushion body, the integrally formed upper air cushion (5) and lower air cushion (6) being configured in which: the upper air cushion

(5) is provided with a given number of mutually communicating air chamber groups (51) and the air chambers may be in any geometrical shape, the communicating passages (52) between individual air chambers being also provided with height differences from said air chambers, such that the air-cushion (5) can be repaired; one of the air chambers in the air chamber group (51) of the air cushion (5) is provided with a bellows-type hollow bent tube (9) which communicatingly connects with one of the air chambers in the air chamber group (61) of the air cushion (6), mutually communicating air cushions (5) and (6) are thus formed by means of the air chambers in the chamber group (61) of the air cushions (6) which mutually communicates through passages (62); on one side of the folding between the air cushion (5) and the air cushion (6) there is provided with two semi-circular tubular bodies which can be matched into a hollow round tubular passage (7) for mounting a nozzle, which on the other side there is provided with a moleded hollow round tubular passage (8) for mounting another nozzle, which hollow round tubular passage (8) being communicating with the bellows-type hollow bent tube (9) which communicates between the two air cushions (5) and (6) to be used exclusively for inflating the air chamber groups of both air cushions.

The other hollow round tubular passage (7) is also matchingly formed. When the air cushions (5) and (6) are foldingly superimposed and heat sealed into an integral body (adhesive is applied on the top of the air chambers in respectively air chamber groups of both air cushions, such that the respective air chambers are secured into an integral body when being imposed), the hollow round tubular passage (7) is formed for mounting the nozzle and for filling gas into the space around the air chamber groups (51) and (61) of the air cushions (5) and (6); such that the air cushions (5) and (6) will be in one inflation system

and the other spaces created after the heat sealing will be in another inflation system so as to obtain the function of double complementary air cushions which are reparable and have excellent flatness.

In addition, the surface of all air cushions of the present invention may be integrally provided with evenly distributed projected (or recessed) round points (or points of other geometrical shapes) to increase the surface tension and strength of the air cushions so as to have better tension resistance, as schematically shown in Fig. 8.

From the foregoing, it can be appreciated that the "foldable and reparable double-deck air cushion for the air cushioned shoes" not only provides the complementary cushioning function and effect of the double-deck air cushion but also provides the in-use results of being reparable and inflatable without leaking, thus the service life of the air cushion is correspondingly extended. The air cushion of the present invention is tolerant toward being pierced and highly economic and can be formed into an air cushion capable of being automatically inflated such that the air cushion can be inflated to a present required pressure value automatically. Such an invention has unique value and effect in practical use, not found in or matched by conventional air cushions currently available, and is indeed a novel and creative new invention of its kind.

FOLDABLE AND REPARABLE AIR CUSHION FOR  
AIR CUSHIONED SHOES

CLAIMS

1. A foldable and reparable double-deck air cushion for air cushioned shoes characterized in that an air cushion body is composed of two superimposed air cushions with at least one telescopic, hollow bent tube for communicating the filled air or liquid therebetween, the air chamber group provided in each of said air cushion consisting of given number of air chambers is geometrical arrangement or of given number of air chambers is transversal or longitudinal arrangement, and said air chamber group in each of said air cushion being divided into at least one air supply system as required; and that in said air chamber group of said at least one air supply system, for each said air cushion division, there are communicating passages between individual air chambers of the same air supply system, which passages have a given height difference from the top and the bottom of said air chambers, so that said chambers may each contain a given volume of liquid (repairing agent) without the filled liquid (repairing agent) flowing into other air chambers through said passages, thus to obtain an air cushion with double decks superimposed in complementary relation and providing a supporting effect and the function of being reparable; and that the air cushion itself may be provided with a one-way intake valve and a preset safety adjusting valve such that said air cushion can automatically draw air to fill thereinto by compressing and expanding actions, and any excess of pressure will be released through the preset relief valve when a preset valve of pressure is reached by automatic pressurization, thereby to achieve the function of automatic inflation so as to maintain the inflation at a constant pressure.

2. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claim 1, in which, said air cushion body may also consist of two separate air cushions heat sealed in superimposed relation into a single body, said superimposed air cushions being each provided with air chamber group having separate air supply system and said air chamber groups of both air cushions being staggered relative to each other, so that said two air cushions will have the height of only one single air cushion when superimposed.

3. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claims 1 and 2, in which, said two superimposed air cushions are each provided with said air chamber group, which being provided with passages between individual air chambers thereof, said passages being at a position with height difference from the top and the bottom of the air chambers with which said passages communicate.

4. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claim 1, in which, said two superimposed air cushions are each provided with air chamber group, separated according to design, which may have at least one air supply system, i.e., more than one independent air chamber group, said independent air chamber groups being provided with passages communicating between the air chambers thereof so as to form into an independent air supply system.

5. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claim 1, in which, said air cushion is provided with at least more than one air chamber group having independent air supply, each of said air chamber groups being provided with at least one air supply nozzle.

6. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claim 1, in which, said air chambers included in said air chamber groups of said air cushion comprise an arrangement in the geometrical shape of a circle, a polygon, an elongate strip, a curve, or a mixture of shapes.

7. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claim 1, in which, two air cushions of two air cushion bodies which are assembled in superimposed relation may be two separate air cushions superimposed into one individual body by having the respective peripheries heat sealed relative to each other.

8. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claim 1, in which, two air cushions of two air cushion bodies which are assembled in superimposed relation may also be made by folding two air cushions which are integrally formed and communicatingly connected relative to each other.

9. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in claim 1, in which, said two air cushions which are integrally formed and communicatingly connected are communicatingly connected by a given number of telescopic, hollow round tubes, which tubes being for air flow communicating purpose.

10. The foldable and reparable double-deck air cushion for air cushioned shoes as set forth in Claim 1, in which, the double decks of said air cushion may be lined with a piercing proof sheet material between the engaging surfaces thereof.

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11. A foldable and reparable double-deck air cushion for air cushioned shoes which may consist of a full-inserted air cushion and a half-inserted air cushion, characterized in that said full inserted air cushion is provided with at least one row of mutually communicating air chamber groups disposed around the periphery thereof and transversal air chamber groups therein, the peripheral air chamber groups being separated from the inner transversal air chamber groups to form into two air supply systems, and a round air chamber communicating with said transversal air chamber groups is provided adjacent to the heel portion therewithin, said round air chamber being communicatingly connected to the inner longitudinal air chamber groups of said half-inserted air cushion by a telescopic, hollow bent tube, and any air chamber at the rear end of said peripheral air chamber groups of said full-inserted air cushion being communicatingly connected to said peripheral air chamber groups of the half-inserted air cushion by a telescopic, hollow bent tube, such that the respective peripheral air chamber groups of said full and half-inserted air cushions being communicating with each other to form into an air supply system with air being supplied by at least one nozzle; and the respective inner air chamber groups of said full and half-inserted air cushions being mutually formed into the same air supply system with air being also supplied by at least one nozzle.

12. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, two air cushions may be superimposed and heat sealed into an individual body so as to form into a full or half-inserted air cushion body.

13. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, the air chambers of respective air chamber groups of the two superimposed air cushions, may be folded in staggered or opposed relation when being superimposed.

14. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, said two folded superimposed air cushions may be integrally formed, the air chambers of respective air chamber groups of said two air cushions being communicatingly connected by a telescopic, hollow bent tube, and inflation being controlled by at least one nozzle; when said two air cushions being superimposed, respective air chambers are correspondingly engaged, and after respective peripheries of said two air cushions being heat sealed, the interstitial spaces where no air chambers are provided are also communicating with each other and the inflation is controlled by at least one additional nozzle.

15. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, said air cushion may be formed into full-inserted, half-inserted, or any particular sole portion (such as the sole, the heel, etc.) and said air cushion body may be a single air cushion, or two or more superimposed air cushions.

16. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, said air cushion body is provided with a round air chamber on the heel (or sole) portion thereof, said round air chamber being in communication with the air chamber group of said air cushion, and said round air chamber being provided with a one-way intake valve on the inlet end thereof, said passage which communicates between said round air chamber and said air chamber group being also provided with a

one-way valve, such that during the repeated compressing and expanding actions when said round air chamber is being pressed, air is automatically sucked in to fill into all the air chambers of said air cushion so as to effect the function of automatic inflation; and the air chamber group of said air cushion which is being inflated is also provided with a preset safety adjusting valve (release valve) on any portion thereof, such that any excess of pressure will be automatically released through the adjusting valve when the pressure automatically filled in reaches a preset valve of the adjusting valve so as to maintain the filled pressure at a constant valve.

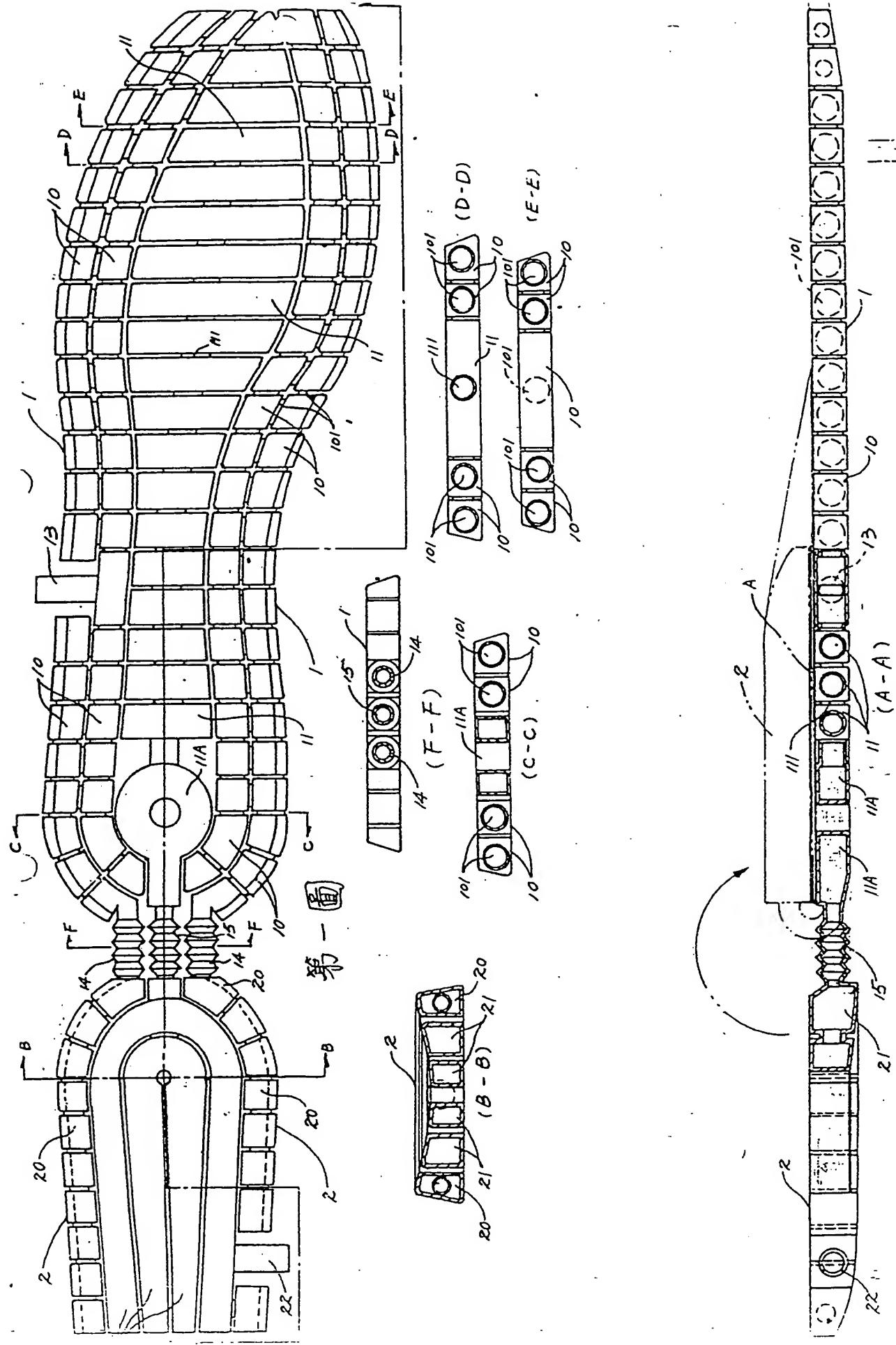
17. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, said air cushion comprises an arrangement of same or different shaped air chambers, said air chambers being communicatively connected by passages so as to form into an air chamber group, the inside diameter of said passage that communicates between each and the adjacent air chambers is less than the height of said air chambers such that said passage is provided with a height difference from the top and bottom of said air chamber.

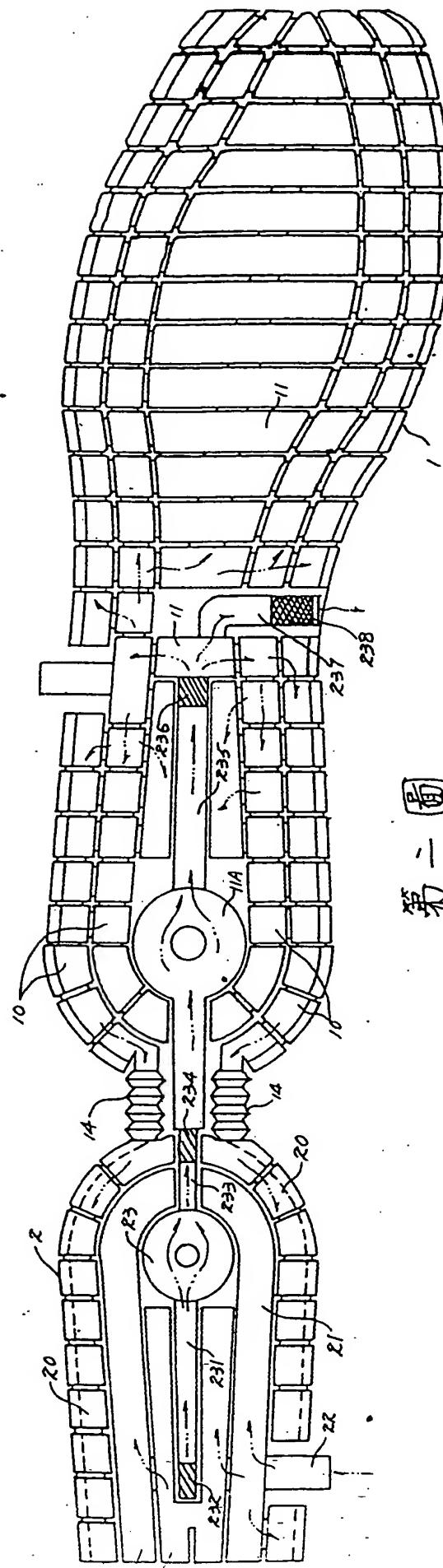
18. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, said air cushion may be a single air cushion, said air cushion being provided with more than add numbered air chamber groups with independent air supply, and each of said air chamber groups with independent air supply being provided with more than one nozzle, respectively.

19. A foldable and reparable double-deck air cushion for air cushioned shoes, in which, said air cushion may be a single air cushion with a cover over lying on the upstanding air chamber group of said air cushion, said

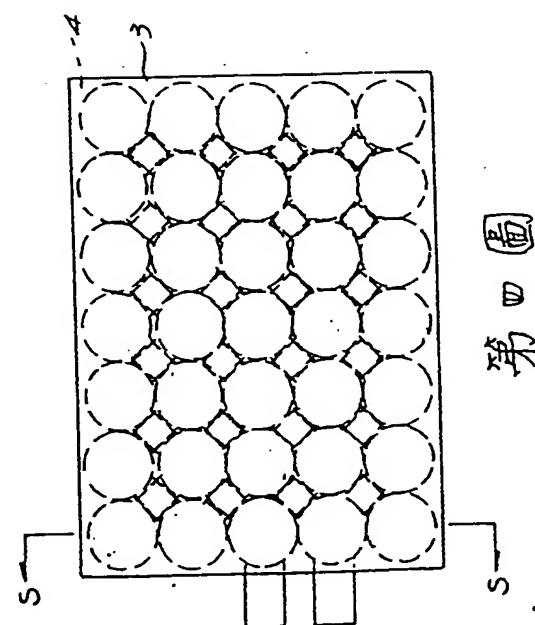
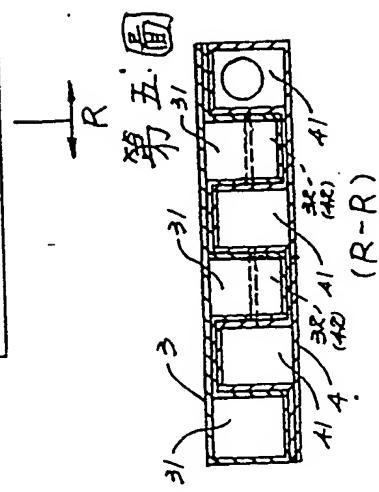
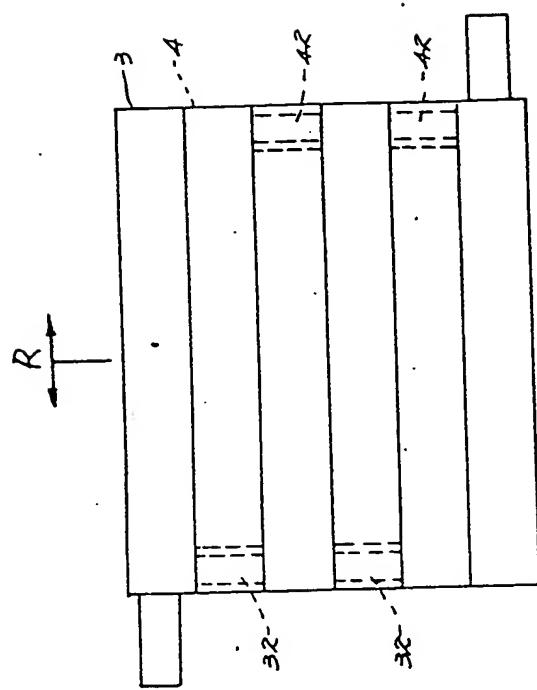
air cushion and said cover being secured together into a single body, and both having at least a hollow, round tubular air supply nozzle, respectively, so as to form into a complementary air cushion with double air chamber groups and having excellent surface flatness after said air cushion and said cover being secured together.

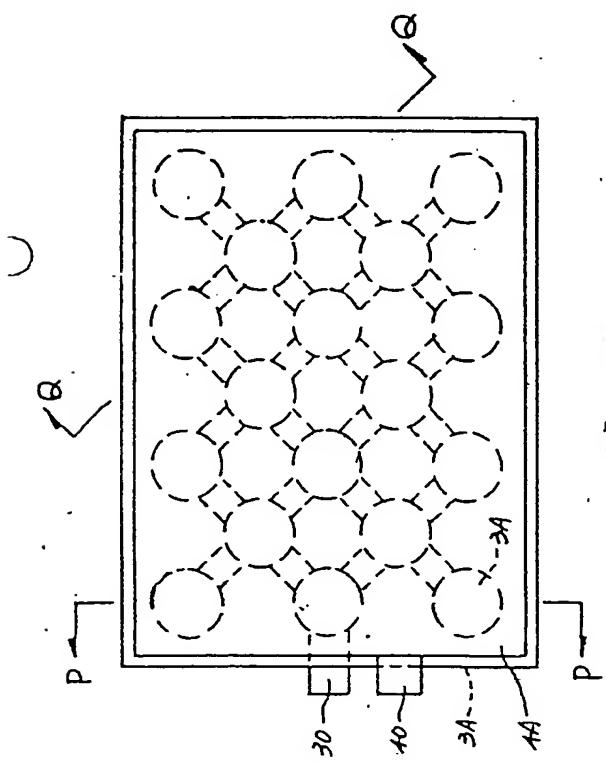
20. The air cushion as set forth in claims 1, 11-19, in which, the surface layer of said air cushion may be integrally formed with evenly distributed raised (or recessed) round points (or points of other geometrical shapes) so that said surface layer of said air cushion will have better surface tension and tension stress.



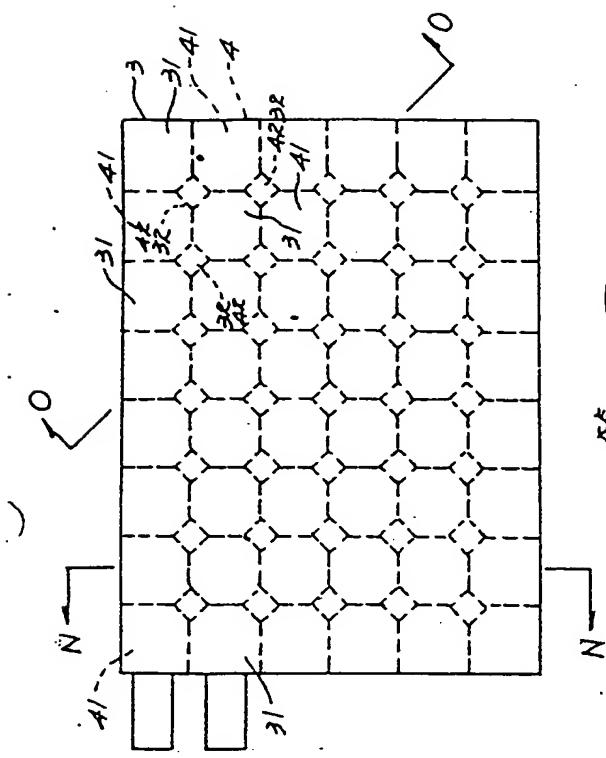


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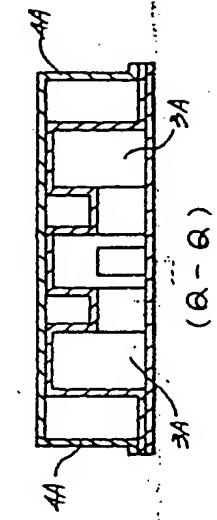
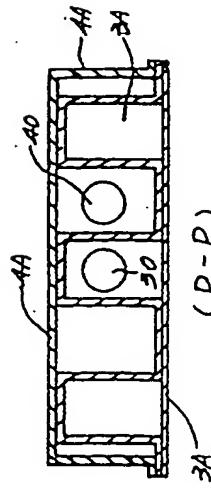
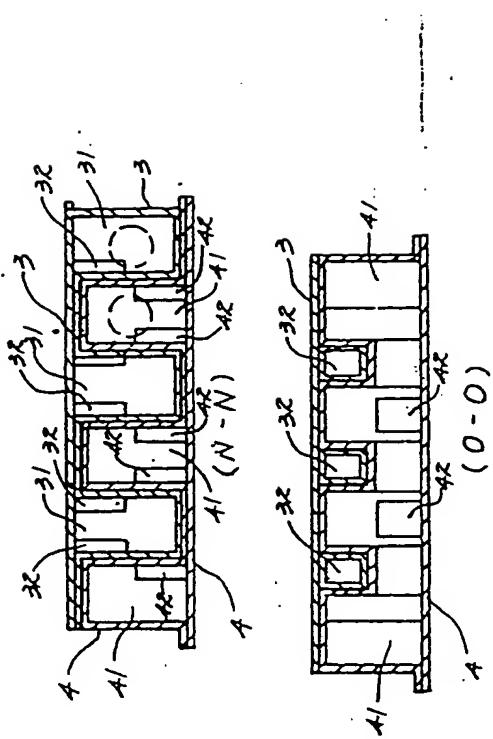


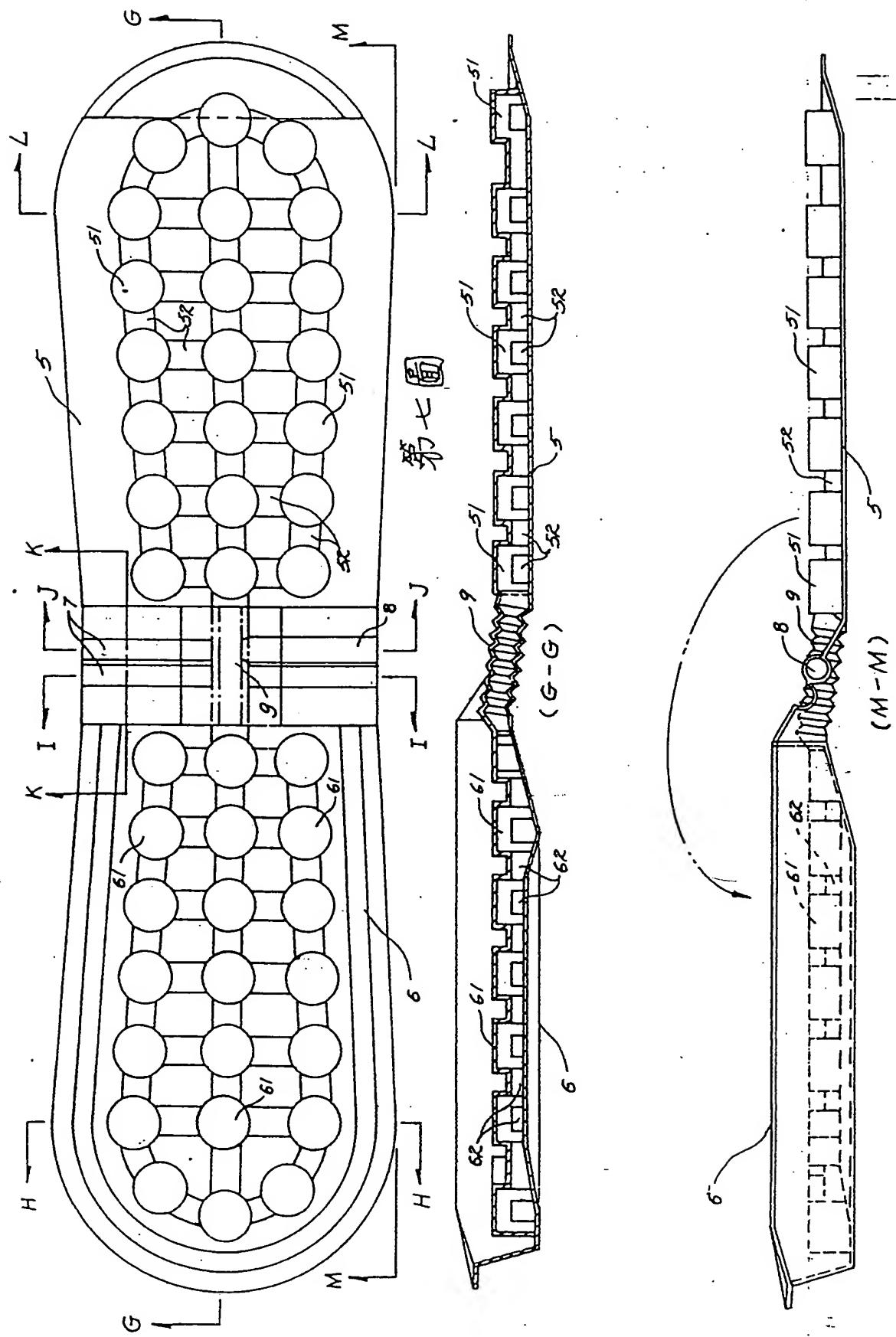


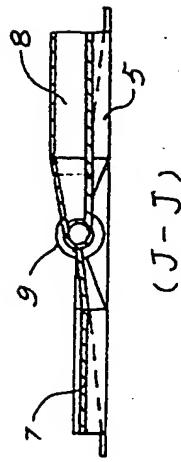
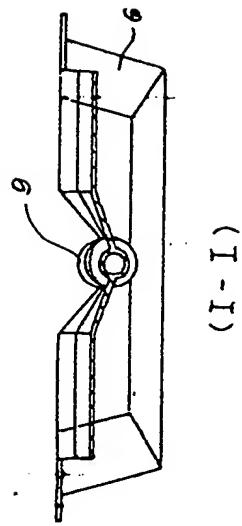
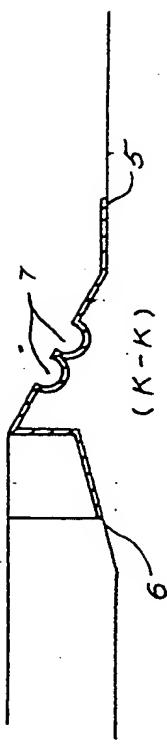
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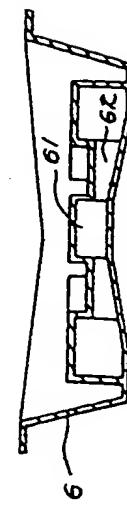
第三圖



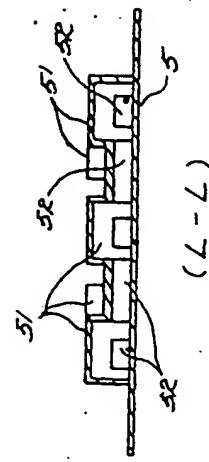




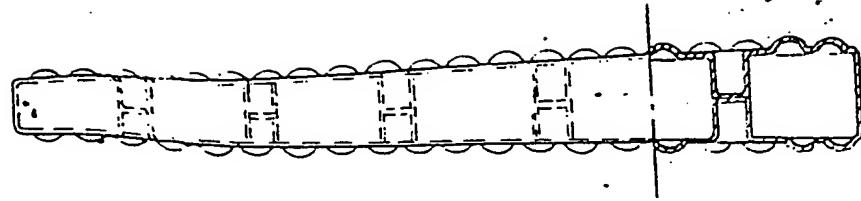
(J - J)



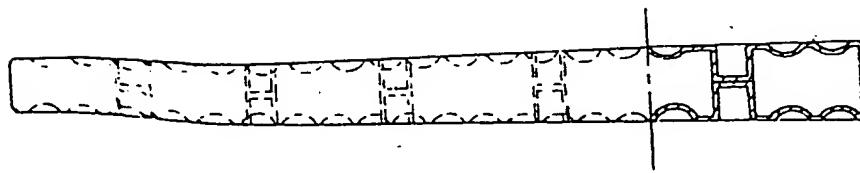
(H - H)



(L - L)

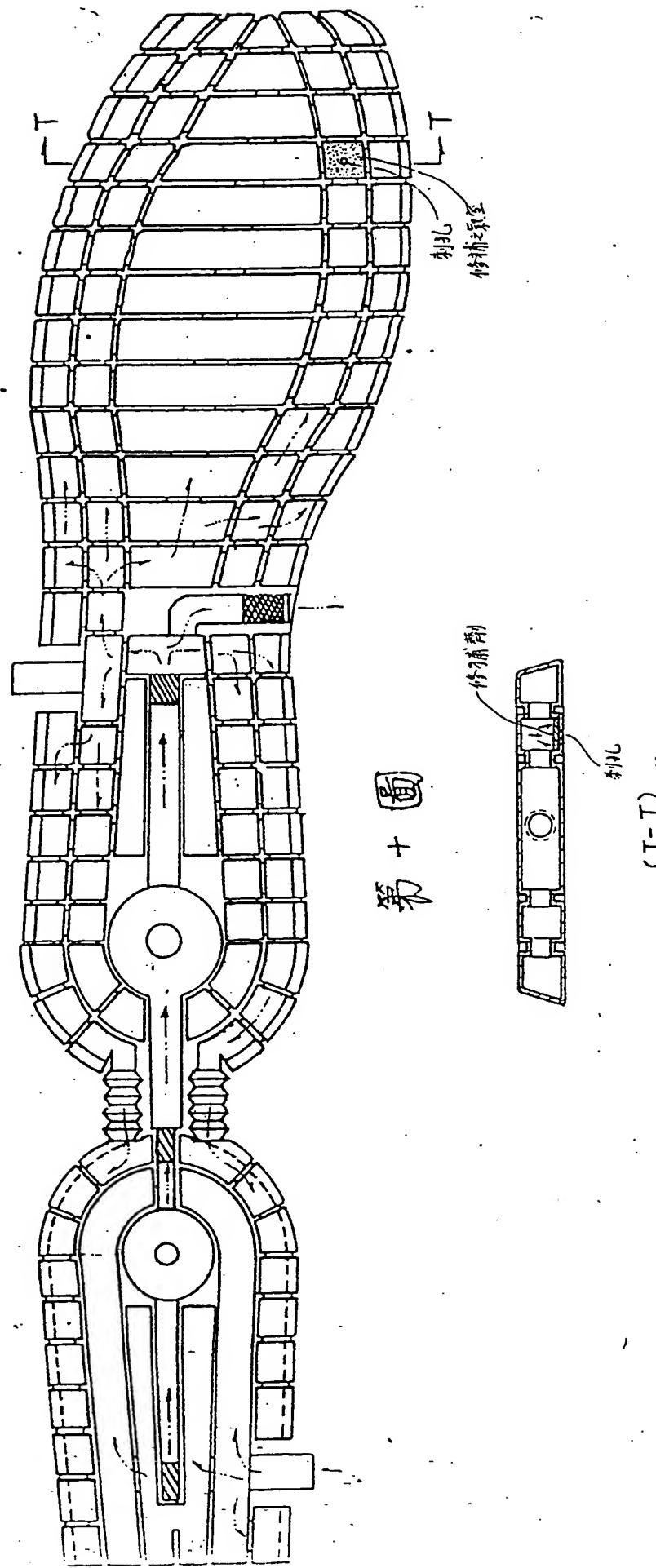


第八圖



第九圖

第十圖



申請日期	75. 1. 27
案號	75100322
分類	

(以上各欄由本局填註)

## 發新型專利說明書

一、發明 創作		可摺疊及修補之氣墊鞋子母氣墊	
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		代表人 姓名	

# 發明名稱：可摺疊及修補之氣墊鞋子母氣墊

## 四 摘要說明：

一種可摺疊及修補之氣墊鞋子母氣墊。

上述氣墊係以中空吹氣模鑄成型予以製成立體中空架構之氣墊。藉氣墊本體以設定數相互導通之氣室，及利用氣墊本身具有子母兩可互為重疊之構狀，得產生可摺疊及修補之氣墊鞋氣墊；另該氣墊亦可利用單向閥體及安全閥之設製，使該氣墊可自行充氣，並保持設定壓力之緩衝彈性者。

## 五 詳細說明：

本系發明之「可摺疊及修補之氣墊鞋子母氣墊」，其主要發明之目的係在於：

- (1) 提供一可修補之氣墊鞋氣墊。
- (2) 提供一摺疊雙層式氣墊，並利用其雙層摺疊設計及獨立充氣之氣室群設計，得具備任一氣室遭刺破後，仍保有另一具支撐性且可充氣之氣室群。
- (3) 提供一重疊式子母氣墊，益增氣墊最佳平面度，且於任一氣墊遭刺破後，另一氣墊仍保有支撐緩衝彈性與功能。
- (4) 提供一具有自動壓縮充氣之氣墊，使該氣墊能自動充氣且保持在設定壓力安全值（或設定值）。
- (5) 提供一上述諸項摺疊式、子母式、充氣式等各式氣墊均可輕易修補刺孔之設計，使氣墊遭刺後仍具有 90% 以上之概率能將其修補恢復正常。

反觀時下一般產製之氣墊鞋氣墊，均以片材熱封而成，其氣墊內所充氣體亦為數種方式予以達成，如：①以常溫揮發成氣體之液體直接注入密封之氣墊內，經液體揮發後

呈氣體充填。②以一般車胎氣咀設於氣墊上，利用規定充氣器具可充入空氣，但該氣墊一旦刺破後即扁掉，且無法修補，而形成完全喪失支撐，重生之效用，故使用壽命於到遇刺破洩氣後即告結束報廢。③另本系發明人前核准專利之立體氣墊，可充氣、液體，且刺破洩氣後，該氣墊仍具有自始存在之立體支撐架構與支撐彈性，所以不扁掉，仍可繼續穿用，但無法修補恢復充氣、液之防洩效果，故不論氣墊如何優異，如果一旦刺破勢必造成無法還原之機會，而此乃一般氣墊鞋壽命最大之威脅。

而上述數種氣墊鞋，除本系發明人已獲專利之氣墊，具有刺破後仍保有自始存在之立體支撐力外，其餘一般產製者（包括世界各國）均存在有刺破洩氣扁掉之嚴重缺點，  
同時其之所以洩氣扁掉之原因可比喻如一般包裝用之氣泡布，因它們均無任何自始存在之支撐功能與緩衝彈力效果，所以就如氣泡布般，一旦破裂即扁掉無法修補後再充氣，毫無重生之機會，也於破裂之同時完全喪失了緩衝彈性之氣墊效果。

嗣而，本系發明人特予以精心研究，而首先發明出本系「可摺疊及修補之氣墊鞋子母氣墊」，以達到雙氣墊，雙氣室群，不畏刺，不扁掉，可修補，可重生，及可自動充氣之氣墊，進而提高氣墊之使用壽命與價值，茲就將本系發明逐列詳述如下：

請參閱附圖一所示為本系發明可修補之摺疊式子母氣墊，其構造係為以一全插式氣墊(1)利用其後端伸縮彎管予以

導接另一半插式一體成型之氣墊(2)；於全插式氣墊(1)本體之周緣係以双排互通之設定敷立 罩氣室群⑩(呈任何幾合圖形之方形、矩形、圓形、三角形等等均可)繞列於氣墊(1)周邊，而再將双排互通氣室群⑩內圍空間設製橫向氣室群⑪，而脚跟部為一圓氣室(11A)，且各橫向氣室群⑪及脚跟部圓氣室(11A)彼此互為導通，但與周圍繞列之氣室群⑩隔離，以形成氣墊(1)具備兩獨立氣室面；而該周邊双排氣室群⑩之充氣則由設於該氣墊(1)之氣咀供應，而氣咀則設於氣墊(1)之中空圓管道⑬者。又，氣墊(1)內側橫向氣室群⑪之供氣則由另一導通之半插氣墊(2)所設氣咀供應。

於氣墊(1)後端周邊氣室群⑩任兩氣室處以一體製成之伸縮中空彎管⑭導接於一體成型之另一半插式氣墊(2)之周邊氣室群⑩，以達氣墊(1)與氣墊(2)周邊之氣室群⑩、⑩為相通者。而半插式氣墊(2)之中間則設數只相通之縱向氣室⑯，與周邊氣室群⑩隔離不導通，而由該縱向氣室⑯，此縱向氣室⑯後端成型之伸縮中空彎管⑮將該氣墊(2)之縱向氣室⑯與氣墊(1)之橫向氣室群⑪相導通，且由設於半插式氣墊(2)之中空圓管道⑯供氣咀安裝，以施氣墊(1)、(2)中央氣室⑪及⑯之充氣者。

同時於該全插式氣墊(1)之上、下表面均為平面狀，而半插式氣墊(2)之下表面亦為平面，但其上表面則為內弧形面，以符合吾人腳跟弧度。於此半插式氣墊(2)上掀反疊於全插式氣墊(1)時，其双氣墊(1)、(2)重疊面係觀有一輕金屬片(A)以防尖物同時刺穿兩氣墊(1)、(2)者，使刺破情形僅由下方全插式氣墊(1)所承擔；同時下方之全插式氣墊(1)之周邊

繞列氣室群(10)，及中間橫向氣室群(11)因互不導通，所以刺破時僅有一氣室群(10)或(11)會洩氣，而另一氣室群(11)或(10)則仍保持存在，所以仍能持有一理想之氣墊緩衝效果，且於未遭刺破時，該兩互不導通之氣室群(10)及(11)可分別充入理想壓力，使該氣墊內外氣墊之壓力能具有理想、適切之彈性及支撐效果。

另上述氣墊(1)周邊氣室群(10)彼此導通之通道(101)係位於氣室高度 $\frac{1}{2}$ 處，所以各通道(101)與氣室群(10)之氣室底部間有一高低位差，該位差設計係能令氣室群(10)任一氣室均可充入設定量之液體。而不會發生通道(101)導流擴散之情形發生。而氣墊(1)之內部橫向互通氣室群(11)彼此間之通道(111)亦相同的距離底部一高度，使任一橫向氣室中充入設定量液體時亦不會由通道(111)導流至彼鄰氣室中擴散，由此互通且位差之通道設計及氣室群(10)、(11)各擁有之氣室均可謂之為獨立空間，所以當任一氣室群(10)或(11)之任一氣室遭刺破後，於修補時得以注射器(前端為針狀：如注射筒)將強力接着劑由刺孔注入氣室內，施予修補處理。

而修補手段係於氣墊刺穿孔中插入注射器，並先將設定修補面朝上再注入強力接着劑，經一段時間後(以一段乾固時間測之)，再將另一同孔刺透欲修補面(原在上方者)朝下，再次注入設定量強力接着劑予以封補，而此修補面之順序須先封補朝上之氣墊層，再來修補着地面之氣墊底層，使穿孔與外部導通之部份為最後封補

，並以膠布封貼於鞋底穿孔處，防止接着劑倒流，如此於一段設定時間後充入之接着劑將平覆於刺破之氣室上之、下層，當充氣時具有功能如防漏墊片之效果而能恢復再度充入氣體，絕不洩氣之功效（此已實際證實者）。

另請參閱附圖二所示，為本系發明之另一可自動充氣及可修補之摺疊式子母氣墊，其子母氣墊之全插式氣墊(1)，半插式氣墊(2)均與上述第一圖者略同，其不同之處乃在於：將半插式氣墊(2)腳跟部中央縱向氣室(21)位於腳跟踏置處設一圓氣室(23)而其他縱向氣室(21)則以原中空圓管道(22)之氣咀所獨立供氣，另外氣墊(2)之周邊氣室群(20)則以双伸縮彎管(24)導通於全插式氣墊(1)之周邊氣室群(10)，但該氣墊(1)之周邊氣室群(10)係與內部橫向氣室群(11)導通，並相通於氣墊(1)之圓氣室(11A)，再由圓氣室(11A)導接於氣墊(2)之圓氣室(23)處，以成一導通路徑；於氣墊(2)圓氣室(23)前方伸一管道(231)，並在管道(231)端口設一單向進氣閥(232)，而圓氣室(23)後方以管道(233)導通氣墊(1)之圓氣室(11A)其間之管道(233)亦設有一單向閥(234)，而圓氣室(11A)後方導通所有氣室群(10)、(11)之管道(235)亦設有一單向閥(236)，並由該管道(235)末端導接之第一氣室處分支一安全洩氣管道(237)，利用該管道(237)端口之安全設定調整閥(238)得構成一可自動充氣，可修補之摺疊式子母氣墊體。

而其自動充氣係由氣墊(2)圓氣室(23)遭壓縮及彈性自動

還原膨脹之同時將氣體由進氣閥(232)吸入，並利用不斷壓縮膨脹促使氣體不斷的吸入並一一通過單向閥(234)、(236)而充入所有氣室中，於設定壓力到達時，則不斷抽入之氣體則由安全設定調整閥(238)自動將超值氣體排出，使子母氣墊自動充氣並一直保持在所設定之壓力值，進而完成氣墊自動充氣之功能。(同時本例各氣室與導氣之各通道仍與附圖一相同，為具有高低位差之設計，故亦為具有可修補者)。

另請參閱附圖三四五所示為本系發明之子母氣墊例。由圖中得知，本系係以兩氣墊(3)、(4)重疊構成單一氣墊，於上、下兩重疊之氣墊(3)、(4)本身均具有設定數立體氣室以構成相導通之氣室群(31)及(41)，在氣墊(3)之氣室群(31)各氣室間以通道(32)對角導通。相同的氣墊(4)之氣室群(41)各氣室間亦以通道(42)對角導通，所以當兩氣墊(3)、(4)對置重疊時，彼此互不阻涉，且利用各氣墊(3)、(4)之彼此氣室群(31)、(41)各氣室頂抹附接着劑，使兩氣墊(3)、(4)重疊時(各氣墊之所有氣墊群之氣室相互錯置插合)，得固着成一單層高度之子母氣墊，同時各氣墊(3)、(4)仍具有獨自之充氣氣咀，所以當氣墊(3)或(4)刺破後，另一氣墊(4)或(3)仍存在；當然的兩氣墊(3)、(4)之各自氣室群(31)、(41)之各自氣室通道(32)、(42)與己身氣墊底部仍為高低位差設計，所以仍可依前述補修方式修補遭刺破之任一氣墊之任一氣室，進而恢復重新可充氣，不洩氣完好如

初之效能，以及產生優異之氣墊表面平面度。

復請參閱附圖六所示，為本業發明之另一實施例，其係由一氣墊(3A)，於氣墊上設一中空圓管道30供氣咀，該罩體亦設有一中空圓管道40供氣咀安裝，以達到罩體(4A)安裝；而於氣墊(3)上方覆蓋另一罩體(4A)固定覆着於氣墊(3A)後，即形成單體雙氣墊之雙氣室群構造，進而具備互補功能及優異之氣墊表面平面度者。

再請參閱附圖七所示，為本業發明之子母氣墊圖例。其係以一體成型製成兩可蓋合成一氣墊體之兩氣墊(5)、(6)，該兩連接一體之上氣墊(5)與下氣墊(6)之構造為：上氣墊(5)具有設定數互通之氣室群(51)，且各氣室可為任何幾何圖形，而各氣室間之導通通道(52)亦與各氣室具有一高低位差，以具此氣墊(5)可修補者；而於此氣墊(5)之氣室群(51)任一氣室處設一伸縮中空彎管(9)導接於氣墊(6)之氣室群(61)任一氣室，利用該氣墊(6)氣室群(61)各氣室之相互以通道(62)導通，而形成氣墊(5)、(6)氣體相通者；而於氣墊(5)與氣墊(6)摺紋處之一側設有兩可對合成一中空圓管道(7)供氣咀按裝之半圓管體，而另側則設有一成型中空圓管道(8)供另一氣咀按裝，且該中空圓管道(8)係與兩氣墊(5)、(6)氣室群(51)、(61)相通之伸縮中空彎管(9)導通，以專施兩氣墊之氣室群充氣用。

而另一可對合成中空圓管道(7)者，係於上、下兩氣墊(5)、(6)相蓋合重疊並熱封成為一體時（此兩氣墊之彼此氣室群之氣室頂均抹膠，以供彼此氣室疊置時接着成一體），即構成中空圓管道(7)供氣咀按裝，且做為兩氣墊

(5)、(6) 氣室群(5)、(6) 外圍之充填氣體用；以達到兩氣墊(5)、(6) 為一充氣系統，而熱封後鏤空之其他空間則為另一充氣系統，以達到雙氣墊互補之功效及可修補之效用與優異之平面度者。

另本系發明之所有氣墊表層均可一體設成具有均佈之浮突（或內凹）圓點（或其他幾何形狀之點）以益增氣墊之表面張力與強度，進而具有更佳之抗張力，此乃如附圖八所示意者。

嗣而，綜上所述，本系發明之「可摺疊及修補之氣墊鞋子母氣墊」，不但具有子母雙氣墊之互補緩衝彈性效能與作用，亦具有可修補恢復可充氣不洩氣之使用效果，相行的氣墊使用壽命長。不畏刺，經濟效益高，實用效果優異，另亦可製成自動充氣之氣墊效果，使氣墊本身能自動充氣至設定之要求壓<sup>力</sup>值，此種種首先創作，合於實用之獨特實用價值與效益，乃時下一般所未曾擁有或能相互匹敵者，實為一首先之實用發明創作。

#### 六 請求專利部份：

(+) 一種可摺疊及修補之氣墊鞋子母氣墊其特徵乃在於：氣墊體由兩氣墊重疊構成，於該兩氣墊間係以至少一支伸縮中空彎管予以導通充填之氣、液體，且各氣墊所具有之氣室群可為幾何圖形之設定數氣室排列構成，或設定數之橫向或縱向氣室排列構成，並依所需將各氣墊之氣室群區分成至少一個供氣系統；而該各氣墊本身區分之至少一個供氣系統之氣室群，其同一供氣系統之氣

室群每只氣室間均具有導通之通道，此通道係與各氣室之上、下方均具有一設定高低位差，使各氣室均能承裝設定量之液體（修補劑），而不致於產生注入液體（修補劑）由通道導流至其他氣室中，以達到双氣墊重疊互補之支撐效用與可修補之效能，同時於氣墊本身亦可設置至少一只單向進氣閥及安全設定調整閥，使該氣墊以壓縮、膨脹之動作吸入氣體充填氣墊，且於自動能自動充壓到達設定壓力值時，能將超值壓力經由安全設定調整閥予以洩除，以達到自動充氣，保持充氣恒壓之效能者。

(二)依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，該氣墊體亦可由兩分離之氣墊重疊熱封而成一體者，且該兩重疊之氣墊各自具有獨自供氣系統之氣室群，同時兩氣墊之氣室群係相互錯置，以達兩氣墊疊合時僅成一單氣墊之高度者。

二  
(三)依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，其重疊之兩氣墊各自擁有之氣室群各氣室間均以通道相通，而該通道位置係與導通之氣室上、下方距離一高低位差者。

四依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，其重疊之兩氣墊各自所具有之氣室群可依設計隔離有至少一個供氣系統，亦即一個以上之獨立氣室群，且將各獨立氣室群所擁有之氣室以通道自行導通成一獨立供氣系統。

五依上述請求專利部份第一項所述之可摺疊及修補之

氣墊鞋子母氣墊，其氣墊所擁之至少一個以上獨立供氣氣室群，各氣室群係具有至少一個之供氣氣咀者。

(六)依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，其氣墊本身具有之氣室群所含之氣室係可為圓形，多邊形，長條形、曲線形等幾何圖形，或者相互混合排列構成者。

(七)依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，其兩重疊組合氣墊體之兩氣墊，可由兩分離氣墊重疊經彼此周緣熱封成一個體者。

(八)依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，其兩重疊組合氣墊體之兩氣墊，亦可由一體成型且相互連接導通之兩氣墊摺疊而成。

(九)依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，其一體成型且相互連接導通之兩氣墊，係以設定數導通氣流之伸縮中空圓管予以導通連接者。

(十)依上述請求專利部份第一項所述之可摺疊及修補之氣墊鞋子母氣墊，其子、母雙氣墊摺疊時之疊貼面，係可夾襯一防刺穿之片材者。

(十一)一種可摺疊及修補之氣墊鞋子母氣墊，其係可由一全插式氣墊與一半插式氣墊所構成，該特徵乃在於：該全插式氣墊周邊繞列有至少一排之互通氣室群，而內部則為橫向氣室群，並令周邊氣室群與內部橫向氣室群隔離，

以構成兩供氣系統，且於內部靠腳跟部設一與橫向氣室群相通之圓氣室，由該圓氣室以一伸縮中空彎管導接另半插式氣墊之內部縱向氣室群，而再由全插式氣墊周邊氣室群之後端任一氣室以伸縮中空彎管導通於半插式氣墊之周邊氣室群者，以達到全插式氣墊與半插式氣墊之彼此。此周邊氣室群相通，共為一供氣系統由至少一只氣咀供應；而全插式氣墊與半插式氣墊之彼此內部氣室群亦為互為之同一供氣系統，且由至少一只氣咀供應者。

(四) 一種可摺疊及修補之氣墊鞋子母氣墊，其亦可為雙氣墊重疊熱封成一體，以製成一全插式或半插式氣墊體。

(三) 一種可摺疊及修補之氣墊鞋子母氣墊，其重疊之兩氣墊，其彼此氣墊之氣室群各氣室於重疊時可為錯置疊合，或對置疊合。

(二) 一種可摺疊及修補之氣墊鞋子母氣墊，其兩摺合重疊之氣墊可一體製成，並以一伸縮中空彎管予以導通兩氣墊之彼此氣室群各氣室，且由至少一只氣咀控制充氣，於兩氣墊重疊時彼此氣室為對應疊貼，而兩氣墊彼此周緣熱封後，未設氣室之空間亦為相互導通，且以至少一只之氣咀予以控制充氣者。

(一) 一種可摺疊及修補之氣墊鞋子母氣墊，係可製成全插式、半插式或任何鞋底特定部位（如腳掌部、腳跟部等），而該氣墊體可為單氣墊，或二個以上氣墊之重疊。

(丙)一種可摺疊及修補之氣墊鞋子母氣墊，其氣墊體上位於腳跟（或腳掌）部可設一與氣墊氣室群相導通之圓氣室，於圓氣室入氣端設有單向進氣閥，而圓氣室與氣室群相通之通道中亦設有一單向閥，以達圓氣室受壓而壓縮、膨脹反覆作動時，能自動吸入氣體充入氣墊之所有氣室中，以完成自動充氣之效用；另於氣墊受充氣之氣室群任一處亦設有一安全設定調整閥（洩壓閥），使自動充入壓力到達調整閥設定值時，令超額壓力由調整閥自動洩出，以保持充填壓力於一恒值者。

(丙)一種可摺疊及修補之氣墊鞋子母氣墊，其氣墊係由相同或不同形狀之氣室所排列組成，且各氣室彼此間以通道導通，以構成一氣室群，而各氣室與彼鄰氣室間導通之通道內徑係小於氣室之高度，使通道與氣室之上、下方均距有一高低位差者。

(丙)一種可摺疊及修補之氣墊鞋子母氣墊，其氣墊可為單氣墊，於該氣墊至少具有單數以上之獨立供氣氣室群，而各獨立供氣之氣室群亦各別具有一只以上之氣咀者。

(丙)一種可摺疊及修補之氣墊鞋子母氣墊，該氣墊可由一單氣墊，於氣墊佇立氣室群之上方覆蓋一罩體，並令氣墊與罩體固着成一體，且各自均具有至少一支中空圓管道供氣咀裝置，以達到氣墊與罩體接固成一體後，形成雙氣室群之互補氣墊與優異之表面平面度者。

(用依上述請求專利部份第一、二~九項

所述之氣墊，其氣墊表層，可一體製成均佈之浮突（或  
具有  
內凹）之圓點（或其他幾何圖案之點），使氣墊表層更  
佳之表面張力及抗張力。

七 圖式部份：

第一圖：本系發明氣墊(一)。

第二圖：本系發明氣墊(二)。

第三圖：本系發明氣墊(三)。

第四圖：本系發明氣墊(四)。

第五圖：本系發明氣墊(五)。

第六圖：本系發明氣墊(六)。

第七圖：本系發明氣墊(七)。

第八圖：本系發明氣墊之表層剖面示意例。

第九圖：本系發明氣墊之表層另一剖面示意例。

第十圖：本系發明修補示意及防漏示意圖。

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